N. A. C. A. BULLETIN

Vol. XXVII, No. 6 November 15, 1945

IN THIS ISSUE

Postwar Pricing and Cost Accounting, by Harry E. Howell..... 215
Control of Work in Process Inventories, by Earl K. Johnson..... 232
Research in Industrial Accounting by Committee on Research..... 253

Our Open Forum..... 258
Cost Currents..... 260
News..... 262
Chapter Ratings..... 263

EDITORIAL DEPARTMENT NOTE

This month's *Bulletin* is evidence that we are beginning to shake off wartime thinking and restrictions in matters of cost accounting and control. The war pushed many cost problems into the background, but, like truth crushed to earth, they rise again. Thus in the first article of this issue of the *Bulletin*, Harry E. Howell applies to present-day pricing problems some thought and ideas which were just beginning to emerge prior to the war. The article covers many phases of the pricing problem and reintroduces with added emphasis the concept of differential or marginal costs.

To introduce Harry Howell to our older members would be a work of supererogation. However, for the benefit of latecomers, it may be said that Mr. Howell has taken an active part in numerous N. A. C. A. activities. He was active in the administration of the Providence Chapter during the period of its early development, filling the office of President for three years. A frequent speaker at chapter meetings and national conferences and the author of numerous stimulating articles in *Year Books* and *Bulletins*, he has also been active in the management of the Association, and in 1941-42 served as National President. Associated with the Grinnell Company for a period of 25 years, he recently resigned as Controller of the company. Today, Mr. Howell holds the high office of Assistant Director for Pricing, Production and Purchases Division, Army Service Forces, in Washington.

The second article is particularly welcome for the clear light it sheds on a somewhat neglected topic, namely, the control of work in process inventories. This is something that each company must work out for itself, but the ideas presented here may serve as a basis for adaptation to specific cases.

Earl K. Johnson is a native Pennsylvanian, who received his business training at the Pittsburgh School of Accountancy Division of the Robert Morris School of Business. Following his graduation in 1934, he and his brother conducted a direct mail advertising business for about a year, which was interrupted when Mr. Johnson joined the Independence Shares Corp. of Philadelphia as Accountant in the Pittsburgh office. In 1939, Mr. Johnson joined the Robertshaw Thermostat Co. of Youngwood, Pa., as Cost Analyst, and in December of that year was transferred to a subsidiary, the American Themometer Co. of St. Louis, to install a standard cost system. The *N. A. C. A. Bulletin* for June 15, 1944, contained an article by Mr. Johnson based on methods developed on that assignment, and his present article throws light on procedures developed at the same company in connection with the control of inventories.

Articles published in the *Bulletin* present many different viewpoints. In publishing them the Association is not sponsoring the view expressed, but is endeavoring to provide for its members material which will be helpful and stimulating. Constructive comments are welcomed and will be published in the Forum Section of the *Bulletin*.

This *Bulletin* is published semi-monthly by the National Association of Cost Accountants, 385 Madison Ave., New York 17, N. Y. Subscription price, $10.00 per year. Entered at the Post Office, New York, N. Y., as second-class matter August 28, 1925, under the Act of March 3, 1879.

COPYRIGHTED BY THE
NATIONAL ASSOCIATION OF
COST ACCOUNTANTS

NOVEMBER 15, 1945

POSTWAR PRICING AND COST ACCOUNTING

By Harry E. Howell, Assistant Director for Pricing, Production and Purchases Div., Army Service Forces, Washington, D. C.

AFTER the first boom phase of the postwar period has run its course it is to be expected that some difficulty may be experienced in selling the full production of the country's industrial plant. If a lack of demand supported by purchasing power develops and persists, and the condition does not respond to the hypodermic of high-pressure advertising and selling campaigns and the sedative of inventory accumulation, the time-honored remedy is to curtail production to meet the lessened demand. This is like a dog chasing its tail, because the unemployment consequent upon curtailment of production reduces purchasing power and consequently the active demand. A newer remedy is based upon the premise that the economic loss from unemployment in the form of reduced purchasing power, idle personnel, and facilities justifies a general charge upon the community to maintain purchasing power, (and thus an active demand) by means of public works programs and unemployment compensation.

In the face of wide-sweeping national and international plans to create an economic climate in which business shall perpetually flourish, it is perhaps in the nature of an anticlimax to discuss some measure of self-help which a business may employ to maximize the utilization of its personnel and facilities. One of these measures of self-help is the sound pricing of the goods produced. The subject deserves careful attention.

Postwar Pricing Approach

Many concerns are immediately faced with the problem of setting prices. For prewar goods re-entering the market the questions may be:

1. Should the prewar price base be re-established?
2. Should the price blindly "follow the leader" who may have jumped the gun and issued prices?
3. Should the size of the potential market, the cost at varying levels of production, and the extent and nature of

competitive retaliation be re-estimated, and prices worked out designed to develop a steady market for the full capacity of the plant?

For new products the questions may be:

1. Should the price be similar to a comparable product or the one superseded or should it be independently set?
2. Should the price be designed to produce the maximum profit with the least utilization of facilities and personnel or should full utilization at a profit be the main objective?
3. Is the price one that will invite competition because the high profit margin is obvious?

These questions are but a few of those which must be answered in determining price policy. The chief concern of this discussion is not with these questions, but the nature and extent of the help that may be given to their solution by cost accounting. It must be pointed out, however, that even though cost accounting, market studies, and sound judgment may find the right answer to the question of what is a sound price for the product, there are many restraints and outside influences. These may prevent a business, particularly a small one, or one in an industry where there are but a few sellers, from using that knowledge. The nature of some of these price restraints is briefly indicated below.

Trade Practices

There are few industries today in which an individual unit may move materially from its position without affecting the others and provoking some counteraction. Therefore a business must necessarily take into account the policy of its competition in determining its own policy, and sometimes the unanimity of policy that consequently results is similar to that which might have been arrived at by agreement or collusion. The fact that these restraints are self-imposed makes them no less dangerous if the original premises are themselves unsound. Blind adherence to price schedules because of fear of change may prevent the full development of the potential market and utilization of capacity. It is natural in these situations of independent "unanimity" to go further and to attempt to formalize this "stabilization" of prices by means of arrangements, understandings, or tacit agreements whereby pricing formulas,

basing-point systems, freight-allowance schedules, and other devices for pegging prices become accepted industry practice. In many cases these industry practices may be of long standing. Being unchallenged, they become a tradition, a custom of the industry, and few have temerity to examine them for their essential soundness, or the courage to change them.

List Prices

A simple illustration is furnished by products sold against list prices, usually printed in a catalog, which never change and which are controlled by a group rather than an individual item discount. Invariable list prices make possible permanent catalogs, simplify pricing, billing, and costing. They become harmful when they remain unchanged long after changes in manufacturing processes, demand relationships, and relative components of cost have occurred and can no longer be compensated for by adjustment of the group discount. Another danger is that the price of an item as a sum of money tends to disappear and with it the mental matching of the price against value and cost. If you do not believe the extent to which the buyer loses sight of the price he is paying for an item sold in this manner, make a few inquiries. You will find that he will say, "I'm buying it at a 25 per cent off" or "I've just got a real good price on that item, an extra 5 per cent." If you then say, "Yes, but does this thing cost 10 cents or 25 cents each and is that a fair price for this item?" it is only in rare instances that you get a correct answer.

Meeting Prices Set by Industry Leader

Another type of restraint is typified in those industries where a larger unit makes the decision on the potential size of the market, the relative share of the members of the industry in that market, the desired utilization of the capacity of its own plant, and then publishes price schedules which the rest follow. It cannot be said that true competition exists where all that occurs is a matching of prices. Instead the seller has concurred in the estimates of the leader regardless of his own sales potential, his own production capacity, his own financial strength, and the relative quality of his product. Thus he relinquishes control to a large extent over the correction that proper prices might bring to unused capacity, in-

ventory accumulations, and desired profit margins. In some industries where the concentration is very great, these profit margins may be handsome indeed for the small business unit, but it is hardly independence to be permitted an existence because one is useful as a defense against charges of monopoly.

Where a business has examined the price structure and is convinced that it does not help that particular concern to create demand and thus employ its full facilities, it takes great courage to act upon its judgment. In true competition where a seller lowers his price he expects that his competition will shortly meet that price unless they can maintain a quality or a service differential. But he reaps at least a temporary advantage in being able to make sales and possibly a permanent advantage to himself and the industry by broadening the permanent market. It is not the fear that his competition will reduce prices *uniformly* and *soundly* that restrains him, but rather the knowledge that competitive price cuts will probably be punitive; that is, they will apply only to his products, or in his territory, or to his class of customers, or be below cost. In other words the prices will be designed to punish him for getting out of line or, if his independence is incurable, to put him out of business.

Cutthroat vs. Controlled Prices

The term "cutthroat competition" is sometimes applied to any reduction in price from an existing level, but for the purpose of this discussion reducing prices even drastically from existing levels is not considered cutthroat competition. Cutthroat competition is defined as taking business at prices which do not recover the differential cost of the item plus a fair allocation of the constant and fixed overhead. Cost accounting has made a great contribution in showing when prices reach the point where they are destructive of purchasing power, thus reducing the market rather than increasing it, and at what point they lead to attrititon of capital and bankruptcy. Adequate cost data are a sound protection against unwittingly using cutthroat prices.

In attempting to cure the effects of cutthroat price competition great impetus and an odor of moral sanctity was given to arrangements which went far in the opposite direction. The National Recovery Act attempted to set floors under prices and to decline un-

reasonable competition at prices below these levels. It implicitly gave support to concerted action in "rectifying" price schedules, and, because controls on unreasonable prices were not placed at the other end of the scale, it promoted the development of formulas for rigid pricing. Some of these prices, based on high cost estimates loaded with contingencies and a pessimistic estimate of the volume over which fixed and constant charges should be absorbed, achieved such a following that not only was the potential peacetime market restricted, but they were applied later to a war demand far exceeding the productive capacity then existing. The grossly excessive profits that resulted necessitated the use of renegotiation, repricing, and excess profit techniques to accomplish what a little independent action on the part of the individual concern in setting prices, excluding the wilful profiteer, might substantially have done with greater ease and less expense.

Somewhere between the extremes of rigid and controlled prices and cutthroat prices there is the field of free and fluid prices measured by the reasonable appraisal by the individual business of its potential market, its cost at varying levels of production, and its capacity and its financial strength. This is the type of price economy in which a system of free enterprise operates as opposed to cartel operation on the one hand and government regulation of prices on the other.

This digression into some of the other aspects of competitive pricing not directly concerned with cost accounting has been made, because the findings of the cost accounting and market analysis studies, if put into effect, might invite disastrous, discriminatory, and punitive retaliation. More important the digression has been made to emphasize that small business has little chance to survive as an independent part of our economy unless it is relieved of these fears. The war has immensely strengthened the financial and physical power of the larger industrial units. They have new plants, new machinery, highly trained workers, advanced research and development projects, patents, technological improvements, tax advantages, and such an overwhelming preponderance of position, largely paid for with tax and Victory bond money, that the power exists, even though it may not be exercised, to hold a suspended death sentence over small business. The importance of this fact to postwar prosperity may be estimated from figures that show

that while there are 30,000 corporations and enterprises employing over 500 workers each, there are over 3,000,000 employing less than 500 workers each.

Role of Cost Accounting in Setting Sound Prices

It may be assumed for the purpose of this discussion that the restraints and considerations mentioned can be successfully overcome. The task, therefore, is to establish sound prices which will tap the full potential market, utilize the personnel and facilities that have been organized or adjusted to this volume, protect the working capital, and provide funds for continued growth. At the same time such prices not being destructive nor inviting destruction, involve certain fundamental facts and relationship which must be known, and these can be obtained best through the processes of cost accounting.

At the start, however, let it be said that the typical product of the usual cost system, namely the historical cost report, is useless and quite often misleading for this purpose. This is true even though the cost is broken down to show a standard or bogey cost and the variation therefrom. Standard costs are an excellent means for perfecting the *control* function of the cost accounting system, but they are not at one and the same time the source of the information necessary to sound pricing. It is highly questionable whether historical costs are of any use at all except as a sort of post-mortem check. Though a post-mortem may disclose what happened, it may be too late to cure the patient.

Basic Postulates

Forward pricing must be based on estimated costs. If these estimated costs are computed from standards scientifically set, so much the better, provided there is constantly kept in mind what is included in the standards. It must be remembered that there is nothing absolute in cost accounting and that the essential truth or validity of its results is related only to the primary concepts or conventions used. The fact that there is no scientific basis for accounting makes it no less useful, and the fact that it must be developed from some theoretical primary concept or convention makes it no less workable, providing the procedures are true to that concept or convention. However, it is fatal to forget that the

primary concept or convention is itself a theoretical premise and that its nature must be clearly understood, and that from time to time the concept must be analyzed and the elements of its working mechanisms fully exposed.

For example, a given standard manufacturing overhead rate represents a working compromise whereby many different items are grouped and related to some base which, while not precisely correct for any one of them, is not sufficiently wrong to be *too* misleading, if used consistently, for the particular purpose of allocating this group of items to the operation or the product. But in that rate there are included costs that are fixed, costs that are constant through wide areas of fluctuating production, and costs that vary in direct relation to production; there are included costs that represent the current spending of money and costs that are non-financial such as depreciation; and there are included costs that may or may not come into being, represented by loadings and contingency allowances. All of these are forcibly related to some base such as productive hours, or labor dollars, or cost of material and labor, or normal capacity expressed in hours, quantities, or dollars, even though the exact correlation of any one of the items with the base is extremely unlikely.

So long as this is not forgotten and these constituents of the rate and the base for allocation are from time to time exposed, management can make effective use of figures derived from cost records without danger of being misled.

Fundamental Division of Costs for Pricing Purposes

It seems apparent that, as a minimum, costs must be very carefully classified and collected under the following basic groupings:

1. *Financial costs,* representing current expenditures and accruals.
2. *Non-current expenditure costs,* representing costs which may not mature, which may be long deferred, or which are recoveries of sunk costs. Included in this group would be depreciation, obsolescence, amortization, certain types of insurance costs, contingency reserves and allowances, provisions for pension funds not specifically funded, and similar items.

Every cost report designed to give information for pricing purposes should disclose how much of the cost is financial and how much non-current within these definitions.

Each of these categories must then be shown under four classifications (Exhibit 1):

1. *Fixed Costs:* These are the ones to which the concern is committed as a going enterprise whether it produces anything or not. It includes such items as rentals, interest on funded debt, and property, franchise and other taxes not based on income, employment, or rate of production. The failure to recover costs of this type, which are for the most part financial, spells bankruptcy, but that is not equivalent to saying that the precise cost accounting or arithmetical allocation *shall* be recovered on each item and each sale. We will return later to the proposition that the recovery of certain costs in a selling price is a *management* function and not a cost accounting problem.

DIVISION OF COSTS

	Financial	*Non-Current Expenditure*
Fixed Costs		
Constant Costs		
Semi-Variable at varying levels		
Variable		

EXHIBIT 1

2. *Constant Costs:* There are several definitions of constant costs, and the items includible vary with the definition. In using the four divisions suggested here the problem of definition seems to be clarified. As used here the term does not mean those costs which would go on even if the business stopped running; these are better termed perhaps *minimum costs.* Instead it means that group of costs of a going concern which remains very largely independent of the volume of business. There would be included costs of the basic management group,

fixed power costs, maintenance to prevent deterioration, and the cost of the minimum supervisory, technical, and skilled personnel group. Among the non-current expenditures would be included depreciation under the theory of setting up a charge irrespective of production output. The failure to recover this type of costs means that the concern sooner or later will cease to exist as a going enterprise, but again this does not mean that because these costs may be allocated or proportioned in a certain way for cost purposes that they necessarily have to be recovered in that identical manner. Some things are matters of management policy rather than cost accounting. These include the manner in which these costs shall be recouped, when they may be dropped, and discrimination in forcing some products to carry more of the load than allocation on the theory of causal responsibility would justify (for example charging what the traffic will bear).

3. *Semi-Variable Costs:* This is one of the most difficult classifications of costs because much judgment and prophecy are needed to determine the possible changes. Over a long period of history of careful management the bases for the budgets of semi-variable costs may be developed by statistical methods. Budgets are needed through all the levels of productive capacity from start to full one-shift operation and through to the maximum possible utilization of the plant. It will be found that these expenses stay constant through certain wide ranges of production levels, then move sharply vertically. On a chart they characteristically show as a series of steps or plateaus. A simple illustration is in cost of supervision. It may be found that one foreman is needed when production requires from one up to twenty workmen; after twenty an assistant foreman is needed, and the two men may be able to handle up to fifty men. It will be seen that this would appear on the chart as a series of steps, and the critical point of decision is where production spills over to these higher semi-variable cost levels. Under ordinary historical cost methods the differential cost of

this additional production is obscured because the cost is spread evenly over all the units. If the relatively much higher cost of these additional units of production were known, much expansion of facilities, high-pressure selling, and advertising might be avoided. With a full exposure of all the factors, the management can decide how far along the next plateau of cost the anticipated additional production must run to justify the gamble and the increased immobility.

4. *Variable Costs:* These are the costs that vary in close approximation to the fluctuations in the volume of production and of business. Material costs, piece-work labor rates, supply items, clerical costs, packing, shipping, and freight costs are typical.

Some advocate only three classifications of cost, omitting semi-variable, so that the items grouped therein are put in constant or variable cost classifications according to the type they more nearly resemble. This tends to obscure the nature and confound the control of the most significant cost elements. If the classification is properly and carefully made, variable costs are synonymous with differential costs. In other words they represent the cost of an alternative. They represent more particularly the excess of cost that will actually be incurred if a unit is produced over the cost if it is not produced. That this is a far different figure from the historical cost figure is obvious. The historical cost figure shows that unit #999 costs exactly the same as unit #1 and unit #1 the same as unit #1999, an obviously artificial concept useful only for a special purpose and grossly misleading when used by management to make the vital decision of whether to take or to forego a particular piece of business.

In passing, mention should be made of the obvious problem in terminology confronting both cost and financial accounting. The variety of meanings and connotations for any given term causes confusion, misapprehension, and confused thinking. No more important task faces the National Association of Cost Accountants and the American Institute of Accountants than to give the terms used in cost and financial accounting precision of meaning and

exactness of definition, even if this means coining new words or appropriating invariable mathematical symbols.

At this point it seems to have been demonstrated that the first contribution of cost accounting to sound pricing is:

> *A complete set of budgets of costs and expenses, classified first as to financial and non-current, and then subdivided into fixed costs, constant costs, semi-variable costs at all levels of capacity, and variable costs.*

Measurement of Production and Distribution Costs

For the sake of simplicity reference has been made solely to production fluctuations, but it should be clear that these budgets must cover not alone manufacturing costs, but also distribution costs, including selling, packing, shipping and storing, advertising, and other functions of the business. Some accountants advocate bases for measurement of these costs other than units of production, pointing out that production and sales may not be concurrent. Actually no business can produce except to sell, and the fact that an inventory investment policy may be dictated by the needs of the business does not alter the fact that units of production and units of sale must in the long run be the same. Therefore it seems quite proper to use production unit as a base. Failure to do so may cause added complexity by failing to reveal the true cost of the inventory investment policy. When a plant continues to produce in excess of the current rate of sales, it is gambling on a revival of demand at the regular price. It is also foregoing the chance to cut costs to a lower level of production. Finally by its failure to reduce sales prices, it invites the accumulation of inventory and loses the opportunity of stimulating demand.

Minimizing Fixed and Constant Costs

Management, once these costs and their nature are fully disclosed, can more readily solve its problems in connection with them. The chief problem with fixed and constant costs is to minimize the amount, or, to put it another way, to place a maximum limit on these costs which will create the least possible dead weight and immobility. Capital and financial adjustments, changes in plant investment, and the fundamental structure of the corporation may be involved.

In this connection it is prudent to bear in mind the nature of the depreciation charge. It rarely has any relationship to actual wear and tear or obsolescence; it is an arithmetical apportionment more often concerned with tax considerations than actual facts. It is fair to assume that practically all depreciation charges have been excessive. To this must be added the possibility that many concerns have properties fully amortized under the special provisions of the Revenue Act, that such properties are in excellent shape and fully usable in the business and that these concerns will therefore write them up on the books again and start taking depreciation. Depreciation is a non-current cost; for pricing purposes depreciation might better be considered as part of the profit margin and be omitted from cost. Failure to recognize these propositions may lead to erroneous managerial decisions, such as refusal of business with all that involves by way of curtailed production and unemployment.

Length of Time for Cost Recovery

Management's second problem is whether these costs shall be recovered on a risk or venture basis or whether the business is such that a steady rate over a long period can be counted upon to return the costs. The distinction may be pointed out as that existing in the price charged for the production of an exclusively war item and, let us say, the rate to be charged for electric power. In the first instance the costs must be recovered in one fell swoop because the risk of being left with part unrecovered is too great. In the second instance the demand, the lack of competition, and the continuity of business are such that the rate of recovery must be stabilized and spread over a long period.

Cost Allocation

The third problem of management is the allocation of these charges, not for cost accounting purposes, but for recovery. For cost accounting purposes the concept generally used for allocation is *causal* responsibility. For recovery in price discriminatory and arbitrary allocation is practically universal. Discrimination in allocation of costs and expenses is reflected in selling prices which

show that these costs are recovered on the basis, for example, of "what the traffic will bear." In other cases it is reflected by the fact that some business is taken at prices which carry much more than their cost accounting share of these costs while other business is taken at prices which carry a much lesser amount or which in some cases carry no charge at all for many of the costs. This practice is so common that its significance is sometimes forgotten. Most cost systems would show the same cost for running a movie in the morning, the afternoon, and the evening, but the prices which represent recovery of costs are allocated on a different basis. Try to get into the movies after 6 p.m. at the 11 a.m. price. The whole system of railroad and truck freight rates, pricing for foreign markets, the pricing of luxury goods, off-peak prices for power, night rates for telegrams and telephone calls, the type of haggling that goes on in stores that are not "one-price" stores—all these are illustrations.

Differential Cost Statement

If cost accounting is to aid in the solution of these problems, there must be added to the *budgets* a second contribution in the form of a differential cost statement. This statement represents the additional costs that must be incurred if the business is taken and which need not be incurred if that business is not taken. From these differential cost studies a "profit or loss statement for the alternative" may be prepared. Such a statement shows the income and the cost resulting from taking a particular piece of business compared with the income and cost from foregoing it. The difference enables management to determine the net result of taking or rejecting the alternative and providing the foundation for a sound decision. The difference between this differential cost and the historical unit cost may be amazingly great, particularly in businesses requiring plant facilities and large standby organizations. Many decisions to curtail operations and lay off workers might be avoided if the differential cost and the differential profit or loss were known, after the effect of discriminatory competitive retaliation and even permanent reduction of prices is taken into consideration. A greatly simplified differential cost statement might appear as in Exhibit 2.

	Without the Business	*With It*
Sales	$1,000	$1,100
Variable cost	400	440
Balance	$ 600	$ 660
Constant, fixed, and semi-variable costs at that level	600	600
Profit	$ 0	$ 60

NOTE: The price of the additional business may therefore be below $100. In fact, at any price above $40, the concern is, on the basis of the above figures, better off than if the business is refused.

EXHIBIT 2

Problems of Management with Semi-Variable Costs

This is one of the biggest areas for control for profitable operation and one of the areas in which precise information may determine price decisions. Management efforts should be directed to the end of making these plateaus as long as possible, of keeping the vertical jump as restricted as possible, and to keep production up to the further edge of the plateau without forcing it into the next level by a narrow margin. Thus the third contribution of cost accounting is a series of analyses from time to time of the elements going into the semi-variable cost budgets so that these objectives might be attained.

Management Problems with Variable Costs

Variable costs represent the differential cost which is a factor in the determination of the rate of production and consequent employment. Whether production is to be increased, maintained at the existing level, or reduced, requires constant and detailed attention to the variable costs. Standard cost techniques using time and motion study, methods engineering, waste and idleness control, scrap and salvage control, in short, all the thousand and one ideas, suggestions, and improvements that are immediately translatable into reduced costs, are of extreme importance. Every component of every item of variable cost should be constantly scrutinized and examined, and conformity with past performance records not ac-

cepted as proof of ultimate achievement. For example, scrap and waste allowances, salvage value of materials, and utilization of waste and by-products offer fertile fields for cost reduction and consequent pricing adjustments to create demand.

The labor cost, both direct and indirect, today looms large as a field for a better correlation between cost and performance. To this observer it appears that the solution lies not in technological advances that will make less labor necessary, but in a psychological change that will restore a fair day's work for a fair day's pay and a restored conviction that a high standard of living cannot be attained by high wages unless they are accompanied by high and efficient production. In passing it may be noted that the only true variable labor cost is a piece rate and that as soon as employees are placed on salary or day rates, regardless of output, an element of semi-variable or even constant cost is introduced.

The remainder of manufacturing costs, which unfortunately are usually lumped together, an assortment as varied as the contents of a small boy's pocket, are susceptible to the same treatment, but first the individual items must be disclosed and separately treated.

The fourth contribution therefore is a constant control and surveillance of variable cost items in detail, preferably stated in many cases, in physical terms rather than dollars, furnished at the source of the expenditure with promptness. These matters have been discussed in detail in other articles.*

Application to Distribution Cost

Time will not permit the extension of this discussion to distribution costs, yet it may be that in this field lies the greatest opportunity for reduction in cost, permitting sales prices which will broaden the market. Once the freedom from the harness of financial accounting and formal cost reporting is obtained, it is not difficult to apply the procedures heretofore discussed to these more elusive elements of cost. It is advisable to highlight one or two points.

* *N. A. C. A. Year Book*, 1940, St. Louis, "Streamlining Your Overhead." *N. A. C. A. Bulletin*, December 15, 1943, "Accountants Responsibility to Management In Postwar Planning." *Contemporary Accounting*, Cost Accounting Section, American Institute Publishing Co.

A cost study is not complete until all the factors that go to make the selling price to the ultimate consumer are examined. It is the price to the ultimate consumer that determines the active demand, and if a manufacturer moves his product through distributors or jobbers, the cost of this operation and its consequent effect on prices must be examined. When a manufacturer does not move his products directly to the consumer but relies on distributor or jobber outlets, one of the alternatives which he must study is the cost of this type of distribution as compared with direct distribution. On the one hand his costs will be represented by the price differential given the wholesaler, the cost of servicing the wholesaler, consumer advertising, dealer helps, etc., compared with the cost of advertising, selling, shipping, handling, and carrying stock for selling the consumer directly. If savings can be shown for one method or the other, the problem then is to determine the effect on the potential market of passing along in the selling price any savings that might ensue or, on the other hand, the loss of market if a method is adopted which involves higher cost.

Many distribution costs will be found to be practically constant, or at least semi-variable over large areas of levels of business, and here the question of the price at which to take or leave business is vital. Under the ordinary type of product or territory or salesman profit and loss statement it is impossible to determine the effect of taking or foregoing a piece of business, of dropping or taking on a line of product, or a territory, or of hiring or firing a salesman. Many a retrenchment in supposedly loss sales ventures has cost more than was saved because the load of constant costs and semi-variable costs has fallen more heavily on the business that is left.

The fifth contribution, therefore, is a product, territory, or salesmen profit and loss statement that disentangles the constant and semi-variable costs from the variable costs and that shows the net balance that is contributed by the difference between the income and the cost incurred *solely as a result of that particular operation.* It is from this net contribution that the constant, semi-variable, and fixed costs are met, and before it is thrown away it must be decided where else the recovery is to come from or how these costs may be reduced (Exhibit 3).

SALESMEN'S PROFIT AND LOSS STATEMENT

Salesman	*Historical Cost*	*Sales Income*	*Variable Cost (Includes Sales Cost)*	*Balance*	*Depreciation*	*Contribution to Fixed, Constant, and Variable Costs*
A	$1000	$1000	$300	$700	$50	$650
B	750	1000	400	600	50	550
C	750	1000	400	600	100	500
	$2500	$3000				

Total Margin	$1700
Less fixed, constant, and semi-variable costs (exclusive of depreciation)	1200
Profit	$ 500

NOTE: It is clear from such a statement that if A who shows no profit is fired, $650 goes against B and C, the operations show a $150 loss, and $50 depreciation remains unrecovered.

EXHIBIT 3

Advertising Cost

The advertising cost deserves special study. It is customarily treated as a cost of obtaining sales, i.e., of maintaining and developing the market, and therefore properly chargeable against units of production. But examination will disclose that advertising serves many purposes not the least of which is price maintenance. Advertising may be an alternative form of competition to price reduction. For example there is active competition in certain brands of cigarettes, but rarely price competition. Instead there is competition in claims regarding sore throats, social distinction, mysterious ingredients, etc. Advertising designed to prevent price competition, to build consumer preference without a price differential, or to smother competition likely to resort to price reductions should be separately considered. Such advertising is not a necessary cost of maintaining or expanding the demand, and thus of the units produced, but instead it should be treated as a sort of func-

tion or reduction of the price itself. The issue is then not obscured.

Conclusion

No attempt has been made to deal exhaustively with this subject but merely to open up and disclose the importance of this great and vital task for cost accounting. It is apparent that for the time being at least there is ample productive capacity in almost every line while at the same time there is an incalculable need for almost every conceivable type of goods. Whether this need can be transformed into *active buying* depends on purchasing power and right prices. Prices have not moved freely since NRA days and in many lines long before. It is possible that much of the strain of postwar transition and wide fluctuations in business levels would be mitigated by studies which would make prices more flexible and more sensitive to the correlation of supply and demand.

CONTROL OF WORK IN PROCESS INVENTORIES

By Earl K. Johnson,
Cost Accountant, American Thermometer Company,
St. Louis, Mo.

SINCE work in process inventories are the life blood of any manufacturing organization, control of the flow of these inventories is essential to the robust health of the organization. Overstuffing of work in process inventories causes financial indigestion; underfeeding causes production anemia likely to result in customer complications. A balanced diet of raw materials, digested rapidly and well by a vigorous labor force provided with sharp production control, will usually result in healthy work in process inventory conditions.

Segregation of Inventories

Inventories should be segregated in the operating ledger so that investment in raw materials by products and in work in process

Mr. Johnson wishes to offer acknowledgment to his associates at the American Thermometer Co., Ralph Jacobsmeyer, Production Control Manager, and Russell Lowe, Inventory Control Manager, for their suggestions and ideas over a two-year period for the improvement of the system outlined.

by products are clearly reflected. Proper transfer from raw material inventories to work in process inventories must be maintained through tight control of stock releases against production orders. In addition to segregation of work in process inventories along product lines, each component of work in process inventories (material, labor, and overhead) will be segregated for each product to give a complete picture of inventory condition. Since good industrial management will insist on monthly financial statements, the changes in work in process inventory condition will be called to management's attention at frequent intervals. When an undesirable trend is revealed by financial analysis, management will be in position to take corrective action.

Responsibility for Inventories

In order that we may clearly appreciate the need for control of work in process inventories, and thereby better understand who is responsible for these inventories, we must examine the various factors that affect work in process inventories. In too many industrial organizations, there is a "whipping boy" called inventory control, on whom management lays the whip whenever inventories get out of control. Yet many inventory ills are definitely traceable to sources far removed from the inventory control department. We should try to keep in mind that work in process inventories represent merely a stage of material in the process of conversion from a raw state to a finished product. The whole conversion process usually involves every function from sales to shipping.

Let us look briefly at the responsibility of the various units of organization, other than inventory control, that exercise some degree of control over work in process inventories. The general management is responsible for the determination of the product to be manufactured.* If management is unable to settle this issue rather definitely, no successful operation can be conducted.

In most plants in normal times, the sales volume, rather than the plant capacity to produce, determines the operation activity. Thus, sales become an immediate factor in the volume of work in process inventory. Certainly no manufacturer would process untold amounts of material without a reasonable assurance of selling

*See "Production Control and Planning," by L. V. Bedell, *N. A. C. A. Bulletin*, for June 15, 1944.

the finished product. In many well-managed sales departments, forecasts of product sales are possible within limits for periods of six months or more in advance. In the plant with which this writer is associated, sales forecasts are being made approximately six months in advance.

Production management probably plays a greater part in the control of work in process than any other single unit of management. It is production management that supervises the work force that processes the material. It is production management under whom production control and planning work. It is production management that must evolve the production short cuts that reduce the production cycle time and reduce the process inventories at the same time.

The inspection department, when not responsible to production management, can easily increase the investment in work in process inventories without ever realizing that it is in any way responsible. Supercritical inspections that cause operator slowdowns, failure to decide what to do with spoiled work, and poor planning of inspection control can easily impede the flow of process material, resulting in an inordinately large amount of such material.

The engineering department, even though seemingly very remote from inventory control, is often responsible for inflated process inventories. Poor engineering design, which is discovered only when assembly lines are reached, can cause terrific jams of work in process. Inconsequential design changes, supposedly for improvement of product, can cause semi-fabricated product to be sidetracked. The result may be a piling up of process material while new material is brought up from the raw stage.

The purchasing department sometimes may also be responsible through failure to make prompt purchases and secure prompt delivery on all component parts, and thus may cause work in process to pile up at the assembly lines. In this connection, inventory control comes in for its severest criticism for requisitioning the needed materials from the purchasing department too late for that department to secure required delivery dates. Inventory control must be fully informed as to promised delivery dates on purchased material and must evaluate those promises in the light of past performance. Not to do so is sheer neglect of duty.

From a purely bookkeeping standpoint, the cost, payroll, and general accounting departments may cause inflation of work in process inventories through improper methods of accounting. This form of inflation is most easily corrected since it is a paper inflation only.

Fundamental Requirements for Control

The fundamental requirements for work in process inventory control are as follows:

1. Product determination.
2. Sales forecasts.
3. Proper engineering data on product.
4. Knowledge of machine capacities.
5. Adequate production planning.
6. Enlightened foremanship.
7. Control of raw material releases.
8. Good follow-up by inventory control.

Each of these has been discussed briefly in its effect on work in process inventories. Now we will attempt to show how these principles are applied in a control system operating in a medium-sized plant. Six products are manufactured, being processed through ten departments. Product parts are not widely interchangeable, but all six product parts may be in process in one department at the same time. Parts total about 5,000 different items. Products are normally sold in a low price range, usually under $5 per unit.

Control of Parts Requirements

Schedules for assembly departments are based directly on customer orders. Fabrication of parts for assembly lines is not based directly on each customer order, but on grouping of orders to provide sufficiently large production runs. In order to assure fabrication of parts to cover every order on hand, assignment of the parts required is made on perpetual inventory records. The perpetual inventory record is in two parts, shown as Exhibits 1 and 1A. Assignments are carried as shown in Exhibit 1A. In the column headed "Assigned," the amount ordered by the customer is shown. Assuming this to be an entirely new item in the line, this assignment would result in a red figure in the "Unassigned Bal-

JAN	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE
SPECIFICATIONS:												LOCATION:					

100 GRO. WT.	RED: ORDERED, NO DELIVERY DATE. GREEN: ORDERED AND DELIVERY DATE	PINK: STOCK OUT DATE. BLACK: EXCESS INVENTORY.	MAX.	MIN.	DISBURSE DR. A/C	ORDER CR. A/C

VENDORS

D-103

No.	NAME	100 COST	No.	NAME	100 COST
1			4		
2			5		
3			6		

	REQUIREMENTS			ON ORDER			VENDOR	PROMISE		RECEIVING RECORD							
	DATE	NEEDS	CANC.	DATE	REF.	QTY		DATE	VERI.	DATE	R. R.	VEN.	WGT.	QTY.	REJ.	ACCEPT.	BAL. DUE
JAN.																	
FEB.																	
MAR.																	
APR.																	
MAY																	
JUNE																	
JULY																	
AUG.																	
SEPT.																	
OCT.																	
NOV.																	
DEC.																	

JAN	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE

EXHIBIT 1

EXHIBIT 1

DATE	ORDER NO.	REF.	TRANSACTION		BALANCE	ASSIGNED	UNASSIGNED BALANCE	DATE	ORDER NO.	REF.	TRANSACTION		BALANCE	ASSIGNED	UNASSIGNED BALANCE
			REC'D	ISSUED							REC'D	ISSUED			
TOTAL								TOTAL							

AMERICAN THERMOMETER CO.
DISBURSEMENT RECORD

EXHIBIT 1A

ance" column, indicating that no material for this order had yet been ordered from suppliers. When a purchase order is issued to cover the parts required, the quantity on the purchase order would reduce the red figure in the unassigned balance column. When there is material on hand and on order, the total of the two items represents the unassigned (i.e., available) balance, less whatever assignments have been made against available stock to cover customer orders. Since most products are made from many parts, it is necessary to have the engineering department prepare a bill of materials, showing all the component parts for the product. Then, when a customer order is received, each part is assigned, reducing the available or unassigned balance and causing either a production or a purchase order to be issued. This process of assignment is continued down through all the subassembly stages, until all raw material requirements are ordered. By the use of this assignment method, materials are assuredly available for production of customer orders. This method has one weakness. If the procurement period plus the production cycle time is greater than the delivery time required by the customer, then a backlog of inventory in process must be maintained and the assignments simply used as the means of replacing material used. When this condition exists, the sales forecast is particularly important as a gauge of the amount of process backlog.

Bill of Materials

Mention was made of the bill of materials in the previous paragraph. The bill of materials is simply a list of the parts required to produce any product. It can, and should be, furnished by the engineering department. In addition to this information, the engineering department should furnish a labor process sheet, showing all labor operations required to complete the fabrication and assembly of the product. The same department should also maintain the record of changes in both these documents, supplying production control and inventory control with changes as they occur.

In this plant, the bill of materials and the labor process sheet serve as the basis for the preparation of a standard cost when the product is first designed for production. All inventories are carried on a standard cost basis, with provision for changes in standards annually or oftener as need arises.

Production Order Issuance

The production control and planning department issues all production orders in the plant. All customer orders clear to production control for promised delivery dates. A copy of the customer order goes at the same time to inventory control for assignment of materials. When the customer order is scheduled, the production control department will show it on the schedule posted in the proper assembly department. Schedules are posted for a month in advance, summarized by weeks, by customers, and by instruments. This gives the assembly department time to prepare for the assembly. The production order, whether it be for an assembly or a component part, consists of four parts. These are:

1. The dispatch card (Exhibit 2) which is sent to the department starting the fabrication.
2. The work in process cards (Exhibit 3) which also go to the department initiating production.
3. The material requisitions (Exhibit 4) which are sent to the stock room.
4. The production schedules (Exhibit 5) which are sent to the various departments through which the material will be processed.

PART NO._____ OPERATION_____

ORDER NO._____

AMT. ON ORDER_____ DEPT._____

DISPATCH CARD

DATE	CLOCK NO	DAILY AMOUNT	REJECTS	TOTAL	POSTED

EXHIBIT 2

Part No._____

WORK IN PROCESS CARD

Job No._____

Dept.	Oper. No.	Operation	Date	Clock No.	Quantity	Loss

MATERIAL REQUISITION
PART NO.
ACCOUNT NO.
DEPT. NO.
ORDER NO.
QUANTITY ORDERED
DESCRIPTION
TIME STAMP
BIN NO.
BIN BALANCE
ORDER NO.
FILLED BY
QUANTITY DELIVERED
ACCOUNT NO.
MATERIAL APPROVED
MATERIAL ASSIGNED
BIN BALANCE CHECKED
UNIT
EXTENSION
AMERICAN THERMOMETER CO. — ST. LOUIS, MO.

EXHIBIT 4

PART NO.	ORDER NO.	QUANTITY	DEPT NO	OP NO.	OPERATION

DATE	CLOCK NO.	QUANTITY	M	P	TO DATE	E.T.	SCHEDULED QUANTITY	SCHED. DATE	DATE	CLOCK NO.	QUANTITY	M	P	TO DATE	E.T.	SCHEDULED QUANTITY	SCHED. DATE

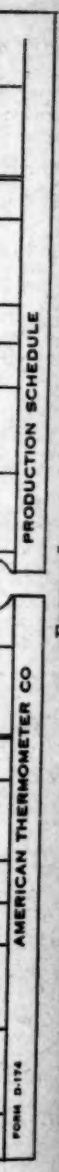

EXHIBIT 5

All production orders carry a serial number. This number is prefixed with a letter to indicate the product to be processed. Each of the four records which form a part of the production order carries the same order number. Each also carries the part number and the quantity of parts to be processed. This relates the four records so that a complete tie-in is effected.

Material Requisitions

All material requisitions are written and released by the production control office directly to the stock room. The requisitions are written from the bill of materials, which automatically provides requisitioning for all required parts and ties in with the assignment of parts made by inventory control from the same bill of materials. It has been found eminently more satisfactory for production control to release all material requisitions than for any other unit of organization to handle the job. Reorders of material by foremen to replace losses will not be accepted by the stock room unless authorized by production control. This eliminates hidden losses since the foreman must account for the shortage through rejection tickets.

When material requisitions are received, the stock department will fill the requisitions and will deliver the material to the proper department on a stock delivery card (Exhibit 6). This tag serves as identification of the material to the foreman of the initial fabricating department. In the meantime, the requisition is completed and sent to the inventory control office. Posting to the perpetual inventory records is made, with the bin balance shown on the records being checked with the balance shown on the requisition. The requisition is then priced, if the item was raw material, and filed for summary at the end of the month. The month-end summary of these requisitions serves the general accounting department as the entry for transfer from raw material to work in process inventory accounts.

Dispatch Card

The dispatch card sent to the foreman of the initial fabricating department serves merely as a notice that an order is to be processed. The foreman will use this notice to make ready his ma-

AMERICAN THERMOMETER CO.

STOREROOM DELIVERY TAG

Form D-241

Part No. To Dept.

From Stores Division

Order No.

Material Description

Material Size

Quantity Ordered

Quantity Delivered

Order Filled by: DATE SHIFT

DATE SHIFT

Requisition No.

Back Order Requisition No.

EXHIBIT 6

chines, since he knows that within a day or two the material will be delivered from the stock department.

Work In Process Card

When the material is delivered and ready for fabricating, each tote pan receives a work in process card. This card serves to identify the material in the pan. It also provides the foreman with a written labor process method, identical with the labor process sheet prepared by the engineering department and used by the cost department as basis for standard cost. The foreman will use this card to see that operators perform the correct operations in the proper sequence. As each operator performs work on a pan of material, the process card is marked with the quantity produced, both good production and the scrap loss. This enables a check to be made at any time of any pan of material to see what has happened to the material that started in production. The process card follows the pan of material until fabrication is complete and the parts are returned to work in process parts stock room, or until the material is assembled and shipped.

If engineering changes occur, the production control department will locate all pans of material affected and will substitute the new process cards. To avoid serious delays in production, engineering changes, if possible, are delayed until the issuance of a new production order.

Scrap Loss

When material is shown on the work in process card as loss, it indicates that either the operator or the inspector has thrown it out as defective. When this is done, a rejection ticket is written. A copy of this ticket is sent to production control if the material is to be reworked, so that production control may issue a rework order to repair the material. If the material is definitely destroyed as scrap, this copy of the ticket goes to the cost department. It is priced there at standard cost, and a daily summary of scrap losses is prepared. This report serves inventory control and production control with notice of losses, serves production management with information to show quality efficiency, and serves the cost department as the means for crediting work in process inventories for the value of material scrapped. This entry is made monthly on a summary of daily scrap reports.

Moving and Checking Work in Process

The responsibility for movement of in process material rests jointly with the production control office and the production foremen. Production foremen are required to keep material moving within the department and to see that completed material moves to the next department. The production control department serves to expedite the flow only when an interdepartmental interruption occurs. Production control, through use of schedules, must watch the over-all picture of movement and be prepared to anticipate jams, and to recommend action to prevent those jams.

To assure proper unit count of material at all stages of production, production control maintains spot checks at critical stages of production. These spot check counts actually are made by production control office employees, usually while material is in transit between departments. It is the actual count control thus established that serves to keep production moving and not reliance on paperwork counts.

Production Record

In order to keep the production foreman fully acquainted with the progress of the various orders within his department, production records on each order are maintained. For each operation on the process sheet, a production record card is prepared and sent to the production clerk in the department where the labor is to be performed. To this operation record is posted daily the quantity of good pieces performed by each operator as shown by the time card turned in by the operator on the job. A glance at the production record form (Exhibit 5) will show the nature of the information carried. This record is carried in the operating department for the convenience of the production foreman. The record serves also to check operator counts as reported on their time cards.

When fabrication is completed on parts, they are sent to a parts stock room, together with the work in process card. The parts stock room is a work in process stock from which parts are released to assembly lines. In entering the material in these stock rooms, the stock clerk checks the count and makes out a ticket called "Notice of Work in Process Material Received in Stock" (Exhibit 7). This ticket is used to notify inventory control that material has been received. The inventory control department will

American Thermometer Co.
Notice of
Work In Process Material
RECEIVED IN STOCK

STOCK ROOM RECORD

Date_____

Part No._____

Description_____

Job No._____

Quantity_____

Bin No._____

New Bin Card Balance_____

Entered Daily Report_____

Clerk Name_____

INVENTORY DEPT. RECORD

ENTERED_____

BIN BALANCE_____

CLERK NAME_____

RETURNS TO STOCK

A/C No. CHARGED_____

A/C No. CREDITED_____

MATERIAL COST_____

LABOR COST_____

Form D-230

EXHIBIT 7

then enter the receipt of the material on the perpetual inventory records, thus increasing the available or unassigned balance. The work in process cards which were with the material at the time it was received into stock are turned over to the production control office, where they are temporarily filed. This completes the control over the physical movement of the work in process material.

Labor Control

The control of the value of labor expended in processing material is extremely vital to over-all work in process inventory control. Labor cost often composes as much as 40 per cent of the total manufacturing cost, so that effective control is needed. In this plant, the labor process sheets prepared by the engineering department are the basis for the control of labor. From the process sheet, the labor process is transferred to the work in process card, which gives the foreman the correct processing method with each pan of material. Since all this information is provided, it should be a simple matter to get the correct information on the employee's time card. This may be theoretically true, but any practical accountant knows that this is one of the most difficult controls to establish and maintain. Permitting the worker himself to enter all the required information on his time card (Exhibit 8) is not at all satisfactory, since he will usually omit most of the required information or will garble it beyond recognition. Requiring the foreman to make out the time card ties the foreman's hands and prevents him from doing effective supervision and planning. Having a clerk write out the time card for the employee is only partially successful, since many errors are made and handwriting is not always to legible.

Labor Record

A method has finally been discovered for printing all the essential information from an Addressograph plate. A plate is made up for each operation on the labor process sheet and is verified before being used. The plate is then given to the production clerk in the department where the labor is to be performed. This plate is inserted in a hand operated machine and used to stamp the time ticket. All information except the quantity produced, the operator's name and clock number, and the time recording are stamped in one operation. The plate is made in two sections, the main body

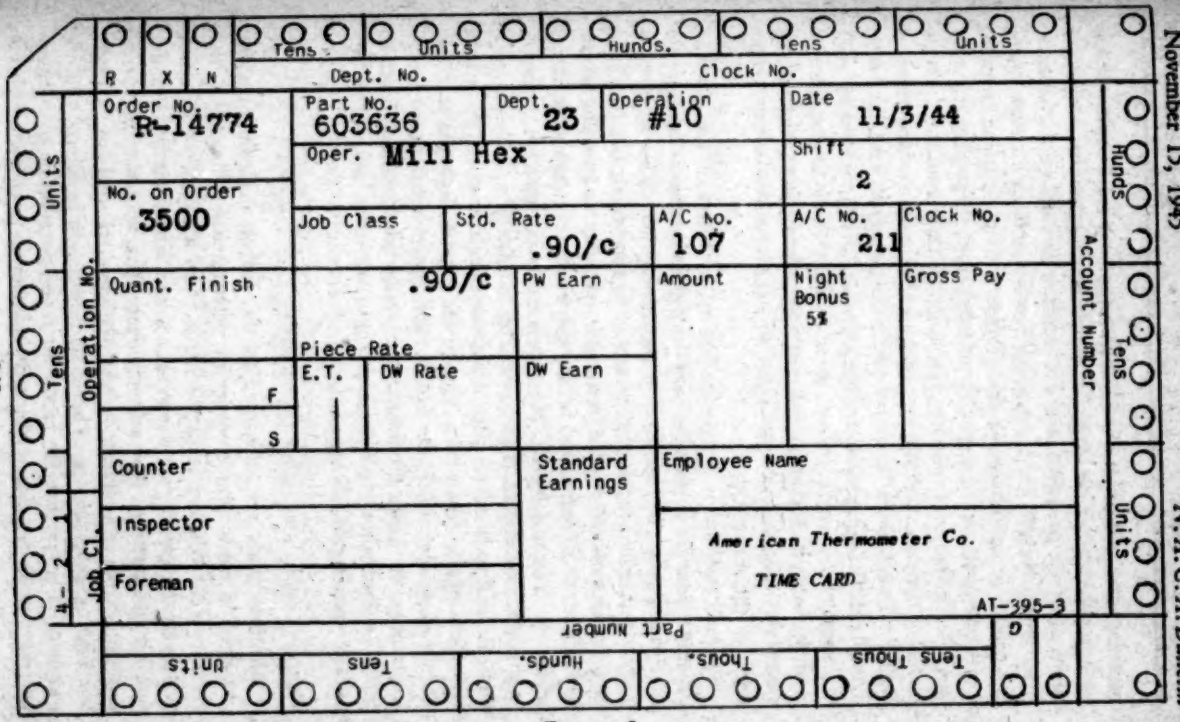
R
X
N
Tens
Units
Hunds.
Tens
Units
Dept. No.
Clock No.
Order No.
R-14774
Part No.
603636
Dept.
23
Operation
#10
Date
11/3/44
Oper.
Mill Hex
Shift
2
No. on Order
3500
Job Class
Std. Rate
.90/c
A/C No.
107
A/C No.
211
Clock No.
Quant. Finish
.90/c
Piece Rate
PW Earn
Amount
Night Bonus 5%
Gross Pay
F
S
E.T.
DW Rate
DW Earn
Counter
Inspector
Foreman
Standard Earnings
Employee Name
American Thermometer Co.
TIME CARD
AT-395-3
Account Number
Hunds
Tens
Units
Operation No.
Job Cl.
Part Number
Units
Tens
Hunds.
Thous.
Tens Thous
G

EXHIBIT 8

carrying the standard fixed information, and the side section carrying the variable information, such as order number and quantity to be made on the order. The machine is fitted with a separate plate which records the date, shift number, and the account number to which night bonus is chargeable. This plate is inexpensive, easily prepared, and practically indestructible. Stamping the time card is an extremely simple operation. The preparation of the plates is done by the timekeeper supervisor. An examination of Exhibit 8 shows the information that is stamped with the plate. The plates for all operations are released to the timekeeper with the production record cards. It is intended that the production record cards shall also be stamped from these plates in the near future to eliminate a typing operation and to assure absolute agreement of the records.

As each operator is assigned a job by the foreman, the operator can use the work in process card with the material to inform the timekeeper what operation is to be performed. The timekeeper merely pulls the proper plate, stamps the time card, and the operator records starting time on a job recorder and begins work. When the job is completed or the shift ends, the time card is returned to the timekeeper. The time card is in duplicate, with the original a carbonized paper and the duplicate a keysort card. The original is used by the production clerk to post production records, and the duplicate is sent to the payroll department at the end of each day. With the use of this control we have been able to increase the posting efficiency on production records, eliminate much back checking to determine the work done, and assure accurate reporting of labor cost.

Payroll Control and Labor Distribution

All time cards are submitted to the payroll department daily, arranged in clock number order by departments. The payroll department immediately rates the cards from a day work rate file, computes the earnings for each card, and summarizes the hours worked and earnings for each employee. This information is hand posted to a payroll register, where daily control totals of earnings are kept by departments. The second operation in the payroll department is to prepare the cards for labor distribution by account or code numbers. Since the code number is predetermined for

each operation, it is stamped on the cards from the Addressograph plate at the time the card is issued. All cards are then keypunched and sorted by departments and account numbers. A payroll clerk then makes a daily summary by departments of the labor distribution. The totals on the daily labor distribution must check with the payroll register. From this point on, labor distribution is a matter of summarizing. A weekly summary is prepared for each department showing the charges to each labor account. This report is given to management on the third working day following the close of the week. It is prepared in spread sheet form to permit weekly comparisons. This report is of course summarized monthly to provide the general accounting department with the charges to work in process inventory accounts for labor performed.

Labor Variance Control

Since all inventories are carried on a standard cost basis, it is the practice of this company to eliminate from inventories, any variations from standard in the labor cost. The payroll department reports actual labor cost on its labor distribution report. The same time cards used for the labor distribution report are checked with the standard cost cards and the standard cost shown on each card. When the Addressograph plate is used, this standard cost per unit is shown on the plate and stamped on the card, eliminating the daily check with standard cost cards. When all cards have been priced at standard cost, a summary by departments and by products is made weekly, showing the actual labor expended and the standard value of the labor expended. This weekly report is summarized monthly to provide the general accounting department with the entry to adjust inventories to standard value. Labor variances are charged or credited to cost of sales.

Pricing Shipments Out of Work in Process Inventories

As shipments are made, a copy of the shipping report clears inventory control to the cost department, enabling the latter to price the shipment at standard cost. Totals of each month's shipments by quantities for each product are maintained; the dollar values are shown at both cost and selling prices. A continuing schedule of the percentage relationship of cost of sales at standard

to sales is maintained in the cost department, serving as a check against pricing and clerical errors. Variations in this percentage are cause for a recheck of sales and cost of sales.

Applied Overhead

One factor in the valuation of work in process inventories has been omitted from the discussion. The value of overhead applicable to work in process is on a plant-wide standard percentage relationship. A single rate percentage is a great deal simpler than a departmental overhead rate. The merits and limitations of methods of overhead application constitute a separate subject and cannot be discussed here. It is sufficient to note that overhead application is usually in some relation to productive labor. If productive labor values in process are controlled, it follows that overhead will in a like measure be controlled.

The entire control of work in process inventories lies primarily in good planning and effective follow-up of the plan. The detailed controls covered in the article merely attempt to show a method which has proved practical in one plant and is not overburdened with trimmings.

Amortization Elections Due Shortly—Companies owning emergency facilities acquired under certificates of necessity are reminded that the law allows 90 days from the date of the non-necessity certificate or Presidential Proclamation, whichever is earlier, to file an election with the Commissioner of Internal Revenue to revise their amortization or depreciation charges on such facilities. No special form is provided. A letter will serve for the purpose, but it is required that the facilities covered by the election be identified. In the absence of notification within 90 days, the election under the necessity certificate stands.

For an analysis of the law reference is again made to Research Series No. 5 in Section II of the June 1 *N. A. C. A. Bulletin.*

* * * *

Fourth Revision of JTR Released—The fourth revision of the Joint Termination Regulation has been released under date of October 11, 1945. The revision incorporates changes which have already been put into effect by means of Army Service Forces Circulars and Navy Directives. Most of the changes are procedural in nature.

RESEARCH IN INDUSTRIAL ACCOUNTING

Statement of Objectives by Committee on Research

The following statement by the Association's Committee on Research will be of interest to all N. A. C. A. members. It reflects the viewpoint of the Committee on the objectives of our research work and outline plans for achieving these objectives. The Committee, under the leadership of its Chairman, Thomas H. Sanders, has held its organization meeting and is proceeding with the development of the program outlined here.

The National Board of Directors of the Association has taken an important step in authorizing the President to appoint a committee to promote and guide the research activities of the Association. This action is not strictly speaking a new departure of policy, but should properly be viewed as a continuation of, and a natural evolution from, the past history and development of the N. A. C. A. From the very beginning it has been educational in aim and purpose. All those who were so fortunate as to be the intimates of Dr. McLeod know that in his mind this serious work was the real justification for the existence of the Association and the basis for its claim upon the duty and loyalty of its members. The very strong human interest note, the social and fraternal aspects so familiar to and so cherished by all members, especially the older ones, has been powerful in making the educational purpose effective.

The Research Directors

One expression of the central phase of the Association's work is to be found in the able and devoted services of a long line of directors in charge of research. They have reflected the belief of the Association's leaders that research was an essential element in its work. Anyone who studies attentively the course of these research activities, as inspired and guided by the successive directors, will there observe an evolutionary pattern in which the present step is a natural and inevitable part. The most recent of these directors, George D. Ellis, has been among the most zealous of them and has actively supported the present develop-

ment. It is both fortunate and fitting that he has consented to become a member of the first committee on research.

Research Department Reports

Prominent and important among the publications of the Association have been the reports prepared by the research department of the national office of the Association under the able and careful guidance of Dr. Marple. These reports have been mainly factual. They have sought by the collection of data to show the extent or prevalence of different practices, and have performed the very useful and necessary function of determining the relative prevalence of different accounting and cost practices. During the war period they have also rendered great service in collating authentic information concerning government regulations relative to accounting for war production and their practical application to industrial conditions. From the date of the Association's formation to the present time, the increasing activities of Government in the cost accounting field have been significant and pervasive.

Looking Ahead—the Committee on Research

The foregoing brief statement of the research accomplishments of the Association serves both to show how substantial they have been and to indicate how they furnish the basis for further progress and development. The directions of such progress are clearly suggested in this review of the past. The broad areas of subject matter will be the same. What the Association must constantly strive for is a consistent, coordinated, and effective attack upon the ever-changing problem encountered in these several areas.

In its early stages much of the work to be developed by the Committee on Research will be directed towards adding to the factual and descriptive information available to members of the Association, thus bringing out in full measure and due proportion the cost accounting practices of American industry. Only when these things have been done can the available factual information serve as the basis for the work of analysis and synthesis which will be the main concern of the committee to foster. It will be necessary to utilize all available materials, published or unpublished, in rounding out this basis of factual information.

The work of analysis will seek to examine the reasons for the several cost accounting practices, the managerial purposes they are intended to serve, and to consider how well the cost practices do in fact achieve those purposes. This phase of the work will bring into sharp focus the many uses to which cost accounting figures are put. It is likely to develop that different purposes require different procedures, so that a priority of purpose, determined for proper reasons of business policy, will be tantamount to determining a priority of method. Choices of method occur, for example, with respect to charging materials into process, with the complementary question of inventory valuation. Different answers result according as emphasis is laid upon profit determination, long or short run views, inventory values in the balance sheet, operating factors, or a number of other considerations.

Out of such analytical investigations and discussion of the adaptation of accounting method to managerial purposes—and these purposes must necessarily include all relationships between the business and Government—will develop what may be called statements of good practice, which can be expected to assume gradually an authoritative position in public discussions of cost questions. Such statements may be regarded as an important part of the Committee's assignment from the National Board; the steps and the pace by which this goal is approached will be a matter for careful consideration by the Committee before seeking approval by the National Board of its recommended procedure.

Relations between business and Government have already been referred to. It is of the utmost importance that the cost accounting views and practices of Government and private enterprise should be harmonized to the fullest possible extent, that each should understand the purposes and necessities of the other, and that the experience of business cost accountants be made available to the Government whenever occasion requires. One important aspect in which the Committee can be helpful is that statements of good practice will furnish support to our members in their dealings with government departments.

With the increasing participation of the Government in the business life and activities of the nation, the importance of sound accounting and cost accounting cannot be exaggerated. Just as they have served both as a measure of accomplishment and as

an account of stewardship by the management of private business enterprise, so must they furnish an equally reliable basis for judgment on the performance of government departments of the services they render to the public.

Committee Organization and Procedure

There are listed below the names of the twenty-eight men who have accepted membership on the Committee on Research. It is gratifying to report that every man who was originally invited has accepted a place on the Committee. The composition of this Committee will furnish an assurance to members of the Association that a constructive and thorough-going program of research will be undertaken.

It will be clear at once that so large a committee cannot, as a committee, itself do the research work which is hoped for. The function of the Committee will be to suggest, plan, and guide a program of research work. It will serve as a funnel for ideas and suggestions, and as a means of arriving at some consensus as to the relative importance and priority to be accorded to different topics suggested for investigation. It will be for the Committee to recommend to the National Board an order of attack and ways and means of getting the work done. It will utilize fully the facilities at National Headquarters and will seek the cooperation and assistance of various members for the purpose of advancing studies and investigations which it desires to promote. In other words it will use for the research tasks which it undertakes the most competent agencies that may be available from time to time. The research reports which result from these assignments will be reviewed by the Committee on Research or by subcommittees of it.

Occasionally the Committee may desire to offer a statement of its own views upon matters of importance and current interest. Such statements will obviously call for the most careful consideration in their preparation. The voice of the Committee as a whole should be used sparingly, and only with the approval of such action by the National Board.

The National Board and the members of the Association will be kept informed by the Committee on Research as to its work and program. They will be given opportunities to express them-

selves on topics under consideration, and all expressions of viewpoint and contributions of experience will be welcomed.

Conclusion

A program such as the foregoing may well enlist the enthusiasm of the members of the Board and of the Association as a whole. Adequately carried out, it will represent fulfillment of a large segment of the obligations which cost accountants owe to society. These obligations include a constant striving to raise the standards of practice and procedure and to increase, on the part of all concerned, the general understanding of the subject matter with which cost accountants deal. These obligations are due to business management, to Government, to financial interests and to the public at large. The past achievements of the Association will become the platform for further service of increasing scope and character.

The Committee on Research

Thomas H. Sanders, *Chairman*
David R. Anderson
William M. Bechler
Dudley E. Browne
Eric A. Camman
Thomas A. Dunbar
George D. Ellis
William H. Franklin
E. Stewart Freeman
Milton H. Friedberg
Howard C. Greer
H. A. Gidney
Edward J. Hanley
Harry E. Howell
David Himmelblau
John B. Inglis
J. Hugh Jackson
Theodore Lang
Oscar N. Lindahl
R. G. Lochiel
H. T. McAnly
William F. Marsh
Logan Monroe
Martin A. Moore
Harold W. Scott
Roscoe Seybold
Charles R. Stevenson
George A. Ware

OUR OPEN FORUM

Place of Internal Auditor in Organization

Editor, N. A. C. A. Bulletin:

Mr. Sheehan in his article, "The Place of Internal Auditing," which appeared in the October 1, 1945, *Bulletin*, implies that an internal auditing staff is of benefit to the accounting department only. I quote, "An effective internal auditing staff should provide informative reports from which the controller will be enabled to control more effectively the operation and functioning of the accounting system."

A really effective internal auditing staff should do more than just provide special information to the controller about the accounting system and operation. It should also provide information to management about other phases of operations such as, purchasing, sales, receiving, warehousing, shipping, property, personnel, etc., if it is to be of maximum value to management. Therefore, I disagree with Mr. Sheehan's statement that the internal auditing staff should report directly to the controller. An internal auditing staff if it is to be really effective should report to an executive officer who is not directly responsible for the operation of any department which is subject to audit. Preferably, it should report to the president, vice president or perhaps, the board of directors. Any internal auditing staff reporting directly to a person in charge of an operation subject to audit could not be looked upon as being wholly independent, because under such an organization setup one of two of the following conditions would prevail:

1. The internal auditor would not criticize policies or violations or recommend changes as freely as is consistent with his duties for fear of censure or reprimand.
2. If reports of audits were submitted without any tempering of facts, such reports would go no farther if they contained facts which were unfavorable to this executive or his department, and corrective action might or might not be taken.

Mr. Sheehan in his article also states, "Some controllers have found it desirable to give a copy of the audit report to the person in charge of the unit or section which was examined, requesting explanations as to the reasons for exceptions found as well as a statement of corrective measures applied."

I doubt that such a procedure is really effective or that it brings results. The persons receiving such reports who are not under the controller's jurisdiction would probably ignore it or simply refuse to take any corrective action recommended, and might or might not offer explanations. That is why some controllers do not find it desirable or worth-while to give copies of audit reports to persons in charge of units or departments which were examined (other than accounting department). However, if the internal

auditor reported directly to the president or vice president and submitted all reports to them, then all copies of the reports sent out to the persons in charge of the units or departments audited could be accompanied by a memo by the president or vice president requesting explanation of the exceptions and of the corrective measures being taken. Such requests would unquestionably bring about the desired results in a very short time.

J. E. Barry,
St. Louis Chapter.

Simplifying the Commodity Profit and Loss Report

Editor, N. A. C. A. Bulletin:

The commodity profit and loss report so ably discussed by Thomas H. Patterson in the July 15 *Bulletin* is now a very timely subject and will become increasingly so as we help to guide and control the development of postwar industry. Management must know costs and profits by commodities which they sell so that special emphasis may be placed upon those articles that produce the best return and corrective measures taken where results do not measure up to those anticipated. However, there is a tendency which I feel we should avoid, if possible. This is a continuing tendency to furnish management with more figures than are necessary and to present these figures in accounting terminology without sufficient analysis.

Under the assumption that commodity profit and loss statements are primarily prepared for the use of sales executives, who as a general rule are not as well versed in accounting as they are interested in sales, it might be possible to eliminate from the statement gross sales and the detail of deductions from sales, thus starting the statement with net sales. There is also some question as to the usability by the sales executive of information as to income tax and return on invested capital; if these also were deleted, ten of the seventeen detail items would be eliminated. It would appear that this space saved could be used to advantage in analyzing the causes of differences between actual and anticipated results.

Minimizing the figure presentation would not only simplify the statement to those who are not accountants, but would get away from exhibiting "cold figures" since the causes contributing to the results would be brought out in sufficient detail to explain differences.

If any questions were raised by the sales executives, additional information could be furnished by the accountant; also if top management had a real use for the figures eliminated, they could be incorporated on a supplemental sheet of the profit and loss commodity report.

The above is predicated upon the premise that reports of profits by commodities are prepared primarily for those in management who can do something about the results shown and are not statistical accounting statements. This view calls for simplicity and the breathing of the "breath of life" into those figures by adding an analysis of causes of variations.

Harris Saunders,
Birmingham Chapter.

COST CURRENTS

Treasury Warning on Pension Plans—The Treasury Department has recently issued a warning to the effect that the abandonment of company pension plans within several years after their adoption may result in a liability for additional income taxes for prior years. In recent years a large number of plans have been given treasury approval, thus permitting the companies concerned to deduct payments to the retirement funds from taxable net income. Many of the plans were inaugurated during the war years, and it is reported that in over 80 per cent of the wartime plans the financial obligation was assumed entirely by the companies although this was true in only 20 per cent of the prewar plans.

While approved plans may include a provision for change or termination it has recently been ruled that if the plan is abandoned for any cause other than business necessity within a few years after it has taken effect, this will be evidence that the plan from its inception was not a bona fide program for the exclusive benefit of employees. Discontinuance of a plan under such circumstances, and without approval of the Bureau of Internal Revenue, would make the company liable on all pension contributions charged against earnings. Following is an excerpt from a recent Bureau ruling on this matter:

> "When a newly established plan is first considered for a ruling by the Bureau, the presumption is that the plan is being established in good faith as a permanent program, unless there is clear evidence to the contrary in the facts and circumstances surrounding the adoption of the plan. Therefore, in most cases the issue of intended permanence is resolved in favor of the taxpayer at the time of adoption of the plan. However, if within a few years the employer decides to abandon the plan and there have been no unforeseeable developments in his business which make it impossible to continue the plan, this must be taken as evidence that the employer did not intend the plan as a permanent program from the time of its inception. Thus, when a plan is discontinued within a few years after its adoption for any cause other than business necessity, the original presumption of intended permanence must be replaced by a presumption that the employer did not intend the plan as a permanent program from the beginning. In the absence of evidence rebutting this presumption, such a plan would then be disqualified retroactively as not being a permanent program for the exclusive benefit of employees in general."

Advertising Expenses Disallowed in a Cost-Plus Contract—A recent decision by the Comptroller General, No. B-50198, is of interest for its insistence on a clear showing of necessity in connection with reimbursable expenses on a CPFF contract.

An aircraft company over a period of several years, during which it was working on a CPFF contract, spent considerable sums for advertising in a trade journal and apportioned part of the cost to the contract. The contractor claimed that the advertising expenditure was not for the purpose of selling particular products but was essentially for the purpose of offering financial support to such trade or technical journals because they are of great value for the dissemination of trade and technical information in the industry. It was claimed that such technical information was of definite benefit in the performance of the contracts. As authority for the claim the contractor relied on rulings by the resident auditors of the Army Air Forces and Cost Interpretation No. 14 issued by the War Department which bulletin "purports to authorize reimbursement for costs in connection with advertising of an institutional nature." The Comptroller General's decision reads in part as follows:

> "While the desirability of offering financial support to certain trade and technical journals in order that information of interest may be distributed throughout the aircraft industry is readily apparent, I am unable to agree that such an expense is so closely associated with the performance of the contract, as required by paragraph (a), section 26.9 of T. D. 5,000. To the contrary, any compensating benefit which may have accrued to the Government as a result thereof would appear to be theoretical rather than real.
>
> However that may be, and conceding *arguendo* that the rendering of financial support to the various trade and technical journals by means of advertising was deemed by the contractor as being necessary to the satisfactory performance of the contract, it by no means follows that the expenses incurred in connection therewith represent reimbursable costs under the contract. The contractor states that the primary purpose of each of the publications involved is to distribute trade and technical information of interest to the aircraft industry. However, there may not be overlooked the fact that it is the contractor's responsibility to effectively and intelligently perform the contract and to bear the burden of such expenses as necessarily may be incurred in order to acquire the knowledge and ability to do so. The rule is well established that where a cost-plus-a-fixed-fee contractor obtains the technical knowledge or "know-how" necessary to fulfill its obligations under its contract, the cost thereof is to be borne by it out of its fixed fee, in the absence of special circumstances or contractual provisions requiring a conclusion otherwise."

The claim was disallowed.

ASSOCIATIONS ELECT OFFICERS

American Institute Elects Williams—T. Dwight Williams of T. Dwight Williams & Co., Oklahoma City, has been elected President of the American Institute of Accountants to succeed Samuel J. Broad. Homer N. Sweet, Partner of Lybrand, Ross Bros. & Montgomery, Boston, and Earl A. Waldo, Partner of Boulay, Anderson, Waldo & Co., Minneapolis, were elected Vice Presidents. Maurice E. Peloubet, Partner of Pogson, Peloubet & Co., New York, continues as Treasurer.

McConnell Heads Controllers Institute—Edwin E. McConnell, Controller of Norton Company of Worcester, has been elected President of the Controllers Institute of America. At the same time, Walter L. Eggert of Moore Business Forms, Inc., Christian E. Jarchow of International Harvester Co., Daniel H. Schultz of Leeds & Northrup Co., Daniel M. Sheehan of Monsanto Chemical Co., and Kelly Y. Siddall of The Proctor & Gamble Co., were elected Vice Presidents; O. W. Brewer of American Gas Association was elected Treasurer; and L. W. Jaeger of Clark-Bobbitt Industries, Inc., Assistant Treasurer. Arthur R. Tucker was re-elected Managing Director and Secretary-Controller.

Atkisson Elected to Head Internal Auditors—Curtis T. Atkisson of Ebasco Services, Inc., was elected President of the Institute of Internal Auditors for 1945-46 at their recent annual meeting. Arthur E. Hald, Consolidated Edison Company of New York, was elected First Vice President; Arthur J. E. Child, Canada Packers, Ltd., Second Vice President; and Theodore G. Zeh, American Surety Company of New York, Treasurer. Mr. Atkisson succeeds Alan Lauckner, Assistant Vice President of the Central Hanover Bank and Trust Company, as President of the Institute.

Delta Sigma Pi Elects White—Kenneth B. White, Vice President of the Dallas Chapter of N. A. C. A., has been elected Grand President of Delta Sigma Pi, a leading professional business administration fraternity with 48 chapters and 16,000 members. Mr. White succeeds another N. A. C. A. member, John L. McKewen, Past President of the Baltimore Chapter.

COLONEL McEACHREN RECEIVES LEGION OF MERIT

The many friends of Colonel John W. McEachren familiar with the contribution he has made to the war effort as Chief of the Cost Accounting Section in the Fiscal Division of the old Service of Supply, and later as Chief of the Audit Division, Office of the Fiscal Director, Army Service Forces, will be pleased to learn that on October 22, 1945, Major General Arthur H. Carter presented Colonel McEachren with the Legion of Merit in recognition of this contribution.

CHAPTER RATINGS

For Four Months Ending September 30, 1945

	Applications Reinstatements and Transfers	Member Attendance	Publications	Publicity	News Letters	Advance Organization of Program	Employment	Board Meetings	Meeting Notices and Reports	Bulk Mailing	Financial Budget and Report	Special Activities	Total
1. Providence	1058	242	150	45	80	100	15	240	20	50	75	100	2175
2. Birmingham	950	146	178	40	80	100	15	210	20	50	75	70	1934
3. Atlanta	1068	88	90	41	80	100	15	236	20	30	75	..	1843
4. Hampton Roads	931	134	98	40	80	100	15	210	19	40	75	70	1812
5. Dallas	498	136	78	39	80	100	15	208	20	50	75	120	1419
6. Scranton	500	95	98	39	80	100	15	240	20	30	75	120	1412
7. Wabash Valley	467	116	90	27	80	100	4	240	20	50	75	20	1289
8. Williamsport	659	97	..	39	80	100	14	148	20	50	75	..	1282
9. Memphis	538	156	10	12	80	100	15	172	20	40	75	40	1258
10. Toledo	362	114	84	43	80	100	15	240	20	30	75	80	1243
11. Jamestown	445	124	..	40	80	100	15	210	20	30	75	100	1239
12. Muskegon	601	200	..	10	..	100	10	169	8	40	75	..	1213
13. New Orleans	365	154	84	40	80	100	15	233	15	30	75	20	1211
14. Los Angeles	420	136	75	36	80	100	15	180	20	20	75	20	1177
15. Indianapolis	307	164	65	30	80	100	15	240	20	50	75	20	1166
16. Philadelphia	291	160	85	45	80	100	15	240	20	..	75	40	1151
17. Utica	431	128	..	41	80	100	8	198	20	40	75	20	1141
18. New Haven	233	170	150	23	80	100	15	210	20	40	75	20	1136
19. New Hampshire	350	140	..	41	80	100	15	240	20	50	75	20	1131
20. Erie	332	90	..	45	80	100	15	210	20	30	75	120	1117
21. Peoria	300	97	..	41	80	100	15	210	20	40	75	135	1113
22. Chicago	197	194	165	45	80	100	15	179	20	40	75	..	1110
23. Syracuse	397	108	..	37	60	100	15	233	20	40	75	20	1105
24. Minneapolis	285	284	..	32	80	100	15	150	20	40	75	20	1101
25. Newark	251	318	..	45	80	100	15	150	20	40	75	..	1094
26. Houston	272	128	60	41	80	100	15	240	20	40	75	20	1091
27. Jackson	445	90	..	13	40	100	12	199	19	40	75	45	1078
28. Denver	213	116	94	39	80	100	15	210	20	50	75	65	1077
28. Milwaukee	193	138	80	28	80	100	15	238	20	40	75	70	1077
30. St. Louis	157	128	150	40	80	100	15	239	20	50	75	20	1074
31. Baltimore	321	108	..	43	60	100	15	210	20	30	75	80	1062
32. Grand Rapids	295	144	..	12	80	100	15	238	20	30	75	45	1054
33. Nashville	280	156	90	27	..	100	15	236	19	30	75	20	1048
34. Worcester	95	124	174	39	60	100	15	240	20	50	75	55	1047
35. Akron	252	94	78	40	80	100	14	238	20	30	75	20	1041
36. Columbus	323	96	10	41	80	100	14	206	20	30	75	20	1015
37. South Bend	263	128	..	30	80	100	14	240	20	30	75	20	1000
38. New York	188	142	85	43	80	100	15	240	20	10	75	..	998
39. Richmond	280	206	..	..	40	100	5	194	20	40	75	20	980
40. Cleveland	167	158	..	45	80	100	15	239	20	30	75	45	974
40. Des Moines	450	94	..	..	40	100	15	150	20	30	75	..	974
42. Lancaster	158	126	..	45	80	100	15	240	20	30	75	80	969
43. Pittsburgh	152	106	135	42	40	100	15	236	20	30	75	..	951
44. Lehigh Valley	200	128	..	45	80	100	14	238	20	30	75	20	950
45. Dayton	198	100	65	45	60	100	15	210	20	40	75	20	948

	Applications Reinstatements and Transfers	Member Attendance	Publications	Publicity	News Letters	Advance Organization of Program	Employment	Board Meetings	Meeting Notices and Reports	Bulk Mailing	Financial Budget and Report	Special Activities	Total
46. Saginaw Valley	270	98	98	37	60	100	14	117	20	30	75	20	939
47. Washington	225	130	..	36	80	100	5	206	8	50	75	20	935
48. Youngstown	242	87	..	30	80	100	15	208	8	40	75	40	925
49. Brooklyn	114	134	60	43	80	100	15	237	20	40	75	..	918
49. Maine	292	94	..	39	80	100	7	141	20	30	75	40	918
51. Hartford	81	112	85	45	80	100	15	240	20	40	75	20	913
52. Tulsa	330	96	..	..	20	100	8	225	20	30	75	..	904
53. Boston	75	150	..	45	80	100	15	240	20	40	75	50	890
54. San Francisco	179	87	..	43	80	100	15	146	20	30	75	100	875
55. Cincinnati	169	95	162	13	20	100	15	163	20	40	75	..	872
56. Rochester	202	110	..	45	80	100	15	150	20	40	75	20	857
57. Rockford	145	124	..	10	60	100	15	192	20	40	75	70	851
58. Fort Wayne	169	90	..	40	80	100	15	210	20	30	75	20	849
59. Cuba	74	70	90	39	80	100	12	240	20	40	75	..	840
60. Tri-Cities	125	112	..	41	80	100	15	210	20	40	75	20	838
60. York	62	100	..	41	80	100	15	235	20	40	75	70	838
62. Harrisburg	210	75	..	39	60	100	15	213	20	30	75	..	837
62. Kansas City	137	88	..	34	80	100	15	238	20	30	75	20	837
64. Greenwich	200	93	..	28	60	100	15	235	20	10	75	..	836
65. Portland	216	88	..	15	..	100	5	231	20	30	70	50	825
65. Springfield	90	124	84	41	80	100	15	176	20	..	75	20	825
67. Evansville	389	74	..	..	60	100	..	106	19	30	25	..	803
68. Bridgeport	90	100	10	41	80	100	15	199	20	50	75	20	800
69. Wichita	70	81	..	28	80	100	15	234	20	50	75	40	793
70. Detroit	83	114	75	13	80	100	15	210	20	..	75	..	785
71. Calumet	151	146	..	15	80	100	9	148	20	40	75	..	784
72. Albany	93	154	..	42	80	100	8	169	20	50	25	20	761
73. Reading	83	87	..	40	80	100	15	210	20	30	75	20	760
74. Buffalo	27	93	..	42	80	100	14	240	20	40	75	..	731
75. Hagerstown	..	112	..	28	80	100	15	172	20	30	75	95	727
76. Decatur	78	92	..	15	80	100	15	167	20	40	75	20	702
77. Binghamton	54	108	..	24	75	100	5	142	20	30	75	40	673
78. Chattanooga	..	108	..	13	80	100	15	208	20	30	75	..	649
79. Louisville	27	112	72	13	..	100	14	90	20	30	70	..	548
80. Cedar Rapids	..	91	..	27	20	100	14	142	20	30	25	..	469
81. Chattahoochee Valley	0	208	..	..	..	..	..	..	8	..	..	..	216
82. Hawaii	..	..	..	..	20	..	..	45	12	..	25	..	102